REMARKS/ARGUMENT

Regarding the Objections to the Drawings:

Fig. 1 has been amended to include the designation "Prior Art".

Regarding the Claims in General:

Claims 26-40, and 42-51 are pending. Claims 26-37, directed to invention I as defined by the Examiner, are currently under examination. Claims 38-40, and 42-49, directed to invention II, are withdrawn from further consideration at this time.

Claims 26-28, 32-37 have been amended to address the issues raised in the Office Action, as discussed below. Other amendments have been made to correct minor errors noted during preparation of this communication. Corresponding amendments have been made in claims 38-40, and 42-45. As these claims are withdrawn from further consideration at this time, they have been designated "Currently amended/Withdrawn".

Review of the application has revealed that original claim 25, which the Examiner designated as invention III in the Requirement for Restriction, had been canceled by a Preliminary Amendment filed concurrently with the application. Claim 25 had been canceled due to its multiple dependency, and was inadvertently not replaced by one or more new non-multiply dependent claims. Claim 50 has been added to rectify this oversight. It is presumed that this claim will be considered withdrawn from consideration at this time, and has been designated as "New/Withdrawn".

New apparatus claim 51 has been added to provide Applicants with additional protection to which they appear entitled in view of the prior art.

Regarding The Allowable Subject Matter

Applicants note with appreciation the Examiner's indication that claim 36 would be allowed if amended to overcome the rejection under 35 U.S.C.112, and if rewritten in independent form. Because this claim is ultimately dependent on claim 26, which is believed to

be allowable as amended, claim 36 has been retained in dependent form pending the Examiner's further consideration.

Regarding the Rejection under 35 U.S.C. 112:

Claims 26 and 38 have been amended to substitute the term positioning member for "guide member". The errors noted in claims 27, 28, 32, 34, 37 have also been addressed. Claims 27, 28, 32, 37, and 42-44 have also been amended to change the "means plus function" recitations to structural recitations to conform these claims to parent claims 26 and 38. Applicants do not consider that these amendments narrow the scope of the claims in any respect.

Regarding the Prior Art Rejections:

In the outstanding Office Action, claims 26-29, and 32-35 were rejected as anticipated by Ooroku et al. U.S. Patent 6,413,850 (Ooroku), claims 26-35 were rejected as anticipated by Kasai et al. U.S. Patent 6,390,351(Kasai), and claim 37 was rejected as obvious over Ooroku or Kasai in view of Fjelstad U.S. Patent 6,253,992 (Fjelstad). Applicants respectfully submit that these rejections were not proper relative to the claims as previously presented. Nevertheless, claim 26 has been amended to highlight certain previously claimed features which the Examiner may not have fully appreciated and to which proper significance may not have been attributed.

Briefly stated, the claimed apparatus includes a template having apertures which define a pattern of solder balls to be placed on a semiconductor substrate. An open-bottom box travels back and forth along the length of the template to distribute the solder balls. In operation, the box moves from one end of the template to the other and back again, and distributes the solder balls to the template during both the forward and return passes. The assembly tilts around a horizontal axis so that the leading edge of the box is lower than the trailing edge during both passes. This permits use the force of gravity to move solder balls and thereby minimizes damage to them from contact with the trailing edge of the box.

An important feature of the invention is that the array of apertures in the template is so located and constructed that the solder balls pass over the apertures during both the forward and

return passes. In the illustrated embodiments, this is accomplished by placing the array of apertures at one end of the template.

The devices shown in Ooroku and Kasai both use a moving ball carrier and gravity to deposit solder balls onto a perforated template, but they differ significantly from the present invention in both construction and operation.

In Ooruku and Kasai, the apertures of the perforated templates (respectively referred to in the references as stencils or arranging members) are centrally located, and the solder balls are deposited in the apertures during only a single pass of the ball container, i.e., in one direction. In Ooruku, at the end of the forward stroke of ball sweeper 230, the unused solder balls "are pushed and discharged outside the alignment stage 310", and the ball sweeper returns to its starting position empty where it must be refilled for the next pass (see Figs. 4(a)-4(d); col. 9, lines 60-65).

Similarly, in Kasai, the apertures in arranging member 10 are centrally located. In a first embodiment (illustrated in Figs. 1-8), the solder balls are stored in recesses 111 at opposite ends of arranging member 10, and are distributed by the movement of damming-up plate 12. For this purpose, the entire assembly is tilted so that plate 12 moves downward as it crosses arranging member 10. At the end of a pass, the unused solder balls drop into the recess 111 at the low end of the alignment plate.

The loaded template is then removed, an empty template is inserted, and the assembly is tilted in the opposite direction. Then, damming-up plate 12 moves across alignment plate 10 back to its original position, and the second template is loaded. Thus, solder balls are deposited in the apertures in alignment plate 10 only during a single pass of damming-up plate 10.

In Kasai's second embodiment (illustrated in FIG. 9), the container's bottom surface has a slit opening through which solder balls are charged into the apertures. Again, however, there is no suggestion to pass the container over one arranging plate twice in opposite directions.

These important distinctions are clearly reflected in the claims. In particular, claim 26, as amended, calls for:

> . . . a container for a plurality of solder balls,

the container being configured and operable to move in a first direction from a first position remote from the positioning member to a second position directly in communication with the positioning member to provide solder balls to the positioning member,

and to move in a second direction opposite to the first direction from the second position to the first position to move the solder balls not in required positions [on the positioning member] away from the positioning member.

From the above description of the prior art, it will be apparent that the devices of the references are not constructed in a manner whereby solder balls pass over, and are deposited on a single template during two opposite passes of the ball container as required by claim 26. The rejections under 35 U.S.C. 102 based on Ooroku et al. and Kasai et al. should therefore be withdrawn.

Claim 37, which is dependent on claim 26, should be allowed for the same reasons.

New claim 51 is dependent on claim 32, and ultimately on base claim 26, and is therefore patentable for the reasons stated above. In addition, claim 51 is directed to a particular feature of the template, namely that the array of apertures thereon is located substantially toward one end so the container is in communication with the apertures only while the container is in the vicinity of the second position. As explained above, in the references, the apertures are substantially centrally located on the template. Thus, claim 51 is patentable for this additional reasons as well.

In view of the foregoing, favorable reconsideration and allowance of this application are respectfully solicited.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 dated October 14, 2003:

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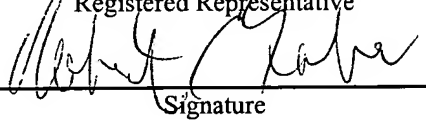
Name of applicant, assignee or Registered Representative



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October 14, 2003
Date of Signature

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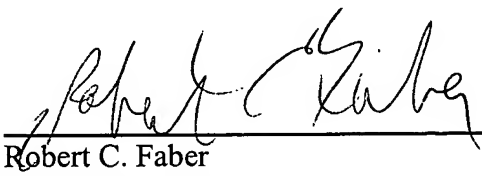
Respectfully submitted,



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